BRITISH STANDARD

BS EN
50384:2002

Product standard to demonstrate the compliance of radio base stations and fixed terminal stations for wireless telecommunication systems with the basic restrictions or the reference levels related to human exposure to radio frequency electromagnetic fields (110 MHz – 40 GHz) — Occupational

The European Standard EN 50384:2002 has the status of a British Standard

ICS 17.220.20; 33.070.01

National foreword

This British Standard is the official English language version of EN 50384:2002.

The UK participation in its preparation was entrusted to Technical Committee GEL/106, Human exposure to low frequency and high frequency electromagnetic radiation, which has the responsibility to:

— aid enquirers to understand the text;

— present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;

— monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this committee can be obtained on request to its secretary.

Cross-references

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This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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This British Standard, having been prepared under the direction of the Electrotechnical Sector Policy and Strategy Committee, was published under the authority of the Standards Policy and Strategy Committee on 9 September 2002

Summary of pages

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EUROPEAN STANDARD **EN 50384**

NORME EUROPÉENNE

EUROPÄISCHE NORM August 2002

ICS 17.220.20; 33.070.01

English version

Product standard to demonstrate the compliance of radio base stations and fixed terminal stations for wireless telecommunication systems with the basic restrictions or the reference levels related to human exposure to radio frequency electromagnetic fields (110 MHz - 40 GHz) – Occupational

Norme produit pour la démonstration de la conformité des stations de base radio et des stations terminales fixes pour les radiotélécommunications, aux restrictions de base et aux niveaux de référence relatifs à l'exposition de l'homme aux champs électromagnétiques (110 MHz - 40 GHz) – Application aux travailleurs

Produktnorm zur Konformitätsüberprüfung von Mobilfunk-Basisstationen und stationären Teilnehmergeräten für schnurlose Telekommunikationsanlagen im Hinblick auf die Basisgrenz- und Referenzwerte bezüglich der Exposition von Personen gegenüber elektromagnetischen Feldern (110 MHz bis 40 GHz) – Berufliche Exposition

This European Standard was approved by CENELEC on 2002-07-02. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

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CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Ref. No. EN 50384:2002 E

Foreword

This European Standard was prepared by the Technical Committee CENELEC TC 106X, Electromagnetic fields in the human environment.

The text of the draft was submitted to the Unique Acceptance Procedure and was approved by CENELEC as EN 50384 on 2002-07-02.

The following dates were fixed:

- latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2003-07-01
- latest date by which the national standards conflicting with the EN have to be withdrawn	(dow)	2005-07-01

Contents

1 Scope

This product standard applies to radio base stations and fixed terminal stations for wireless telecommunication systems as defined in Clause 3, operating in the frequency range 110 MHz to 40 GHz.

The object of this standard is to demonstrate the compliance of such product with the basic restrictions (directly or indirectly via compliance with reference levels) related to occupational exposure to radio frequency electromagnetic fields.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 50383, *Basic standard for the calculation and measurement of human exposure to electromagnetic fields from radio base stations and fixed terminal stations for wireless telecommunication systems (110 MHz – 40 GHz)*

International Commission on Non-Ionizing Radiation Protection (1998), Guidelines for limiting exposure in time-varying electric, magnetic, and electromagnetic fields (up to 300 GHz). Health Physics 74, 494-522.

3 Definitions

For the purposes of this European Standard, the following definitions apply.

3.1
basic restrictions
restrictions on exposure to time-varying electric, magnetic, and electromagnetic fields that are based directly on established health effects. In the frequency range from 110 MHz to 10 GHz, the physical quantity used is the specific absorption rate. Between 10 GHz and 40 GHz, the physical quantity is the power density

3.2
base station
in this product standard, the term “base station” (BS) covers radio base stations as well as fixed terminal stations intended for use in wireless telecommunications networks. A base station comprises the hardware, including tranceivers, necessary to transmit and receive radio signals. Base stations with integrated antennas, base stations with connectors for external antennas and base stations intended for use with external antennas not supplied by the same manufacturer are covered

3.3
compliance boundary
a compliance boundary defines a volume outside which any point of investigation is deemed to be compliant

3.4
continuous exposure
exposure for a duration exceeding the averaging time

3.5
electric field strength (E)
the magnitude of a field vector at a point that represents the force (F) on a positive small charge (q) divided by the charge. Electric field strength is expressed in units of volts per metre (V/m)

3.6
magnetic field strength (H)
the magnitude of a field vector in a point that results in a force (F) on a charge q moving with the velocity v. The magnetic field strength is expressed in units of ampere per metre (A/m)

3.7
power density
the radiant power incident perpendicular to a surface, divided by the area of the surface. The power density is expressed in units of watt per square metre (W/m^2)

3.8
radio frequency (RF)
for purposes of these safety considerations, the frequency range of interest is 110 MHz to 40 GHz

3.9
reference level
reference levels are provided for the purpose of comparison with exposure quantities in air. Respect of the reference levels will ensure respect of the basic restriction. In the frequency range 110 MHz to 40 GHz the reference levels are expressed as electric field strength, magnetic field strength and power density values

3.10
specific absorption rate (SAR)
the time derivative of the incremental energy *(dW)* absorbed by (dissipated in) an incremental mass *(dm)* contained in a volume element *(dV)* of given mass density (ρ)

$$SAR = \frac{d}{dt}\left(\frac{dW}{dm}\right) = \frac{d}{dt}\left(\frac{dW}{\rho dV}\right) \qquad (1)$$

SAR is expressed in units of watts per kilogram (W/kg).

NOTE SAR can be calculated by:

$$SAR = \frac{\sigma E_i^{\,2}}{\rho} \qquad (2)$$

$$SAR = c_i \left(\frac{dT}{dt}\right)_{(t=0)} \qquad (3)\ ^{1)}$$

where

E_i : rms value of the electric field strength in the tissue in V/m

σ : conductivity of body tissue in S/m

ρ : density of body tissue in kg/m^3

c_i : heat capacity of body tissue in J/kg K

$\frac{dT}{dt}$: time derivative of temperature in body tissue in K/s

———————

[1)] This equation does not address thermal regulation in a live person.

4 Conditions for calculation and measurement

The assessment of compliance boundary shall be performed by calculation and/or measurement in accordance with EN 50383.

The base station shall be operating in accordance with the manufacturer's specification. Calculations and/or measurements on base stations intended for use with external antennas shall be performed for at least one typical system configuration consisting of a combination of the base station and an antenna system representative of the intended final use.

5 Limits

The base station shall comply with the relevant limits for occupational exposure specified as basic restrictions or reference levels in International Commission on Non-Ionizing Radiation Protection (1998) Guidelines (see Clause 2).

6 Evaluation of results and determination of compliance

If the average power emitted by the base station is less than or equal to 100 mW then the base station is deemed to comply without testing.

If the average power emitted by the base station is more than 100 mW, then E, H or SAR calculations and/or measurements shall be performed according to Clause 4. The results of calculations and/or measurements shall be compared directly to the limits.

The product is deemed to fulfil the requirements of this standard if the calculated and/or measured values are less than or equal to the limits.

NOTE In the setting of basic restrictions and the derived reference levels, safety factors have been taken into account. In the specification of the assessment method, uncertainty has been constrained. This is the reason for not requiring that the measured values shall be compared to the limit reduced by the measurement uncertainty.

7 Documentation

The legal entity responsible for putting the product on the market shall provide with the product the following information:

1) output power and antenna characteristics, if the product is equipped with integral antennas;

2) a detailed description of at least one typical normal configuration, including antenna system (feeders, connectors, combiners, antennas, etc.), if the product is intended to be used with external antennas;

3) compliance boundaries for occupational exposure. If the product is intended for use with external antennas, compliance boundaries shall be given for the given typical system configurations;

4) information on how to determine exposure levels and compliance boundaries for any optional system configuration not specified in detail;

5) information on how to install the product or the external antennas in order to ensure that workers are outside the compliance boundaries.

Annex A
(informative)

Declaration of conformity

This declaration can be used as a uniform way of giving information of compliance to interested parties.

Information to whom it may concern

DECLARATION OF CONFORMITY WITH EN 50384

Legal entity responsible for putting the product on the market

_____

_____

_____

_____

_____

hereby declares that the product described below

_____

_____

_____

_____

_____

is in full compliance with the requirements of the standard EN 50384

Other relevant information:

_____

_____

_____

_____

_____

Date

Signature

Name

Position

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